

Pushing the Envelope			
1998 Science			
Content Standards			
California Science			
Grade 5			
Activity/Lesson	State	Standards	
Chemistry (pgs. 25-41)	CA	SCI.5.PS.1.f	Elements and their combinations account for all the varied types of matter in the world. As a basis for understanding this concept Students know differences in chemical and physical properties of substances are used to separate mixtures and identify compounds
Chemistry (pgs. 25-41)	CA	SCI.5.PS.1.g	Elements and their combinations account for all the varied types of matter in the world. As a basis for understanding this concept Students know properties of solid, liquid, and gaseous substances, such as sugar (C ₆ H ₁₂ O ₆), water (H ₂ O), helium (He), oxygen (O ₂), nitrogen (N ₂), and carbon dioxide (CO ₂)
Chemistry (pgs. 25-41)	CA	SCI.5.PS.1.i	Elements and their combinations account for all the varied types of matter in the world. As a basis for understanding this concept Students know the common properties of salts, such as sodium chloride (NaCl)
Rocket Activity (pgs. 69-75)	CA	SCI.5.PS.1.f	Elements and their combinations account for all the varied types of matter in the world. As a basis for understanding this concept Students know differences in chemical and physical properties of substances are used to separate mixtures and identify compounds
Pushing the Envelope			
1998 Science			
Content Standards			
California Science			
Grade 8			
Activity/Lesson	State	Standards	
Types of Engines (pgs. 11-23)	CA	SCI.8.PC.1.b	Students know that average speed is the total distance traveled divided by the total time elapsed and that the speed of an object along the path traveled can vary.
Types of Engines (pgs. 11-23)	CA	SCI.8.PC.1.d	Students know the velocity of an object must be described by specifying both the direction and the speed of the object.
Chemistry (pgs. 25-41)	CA	SCI.8.PC.3.b	Students know that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements.
Chemistry (pgs. 25-41)	CA	SCI.8.PC.3.d	Students know the states of matter (solid, liquid, gas) depend on molecular motion.
Chemistry (pgs. 25-41)	CA	SCI.8.PC.3.f	Students know how to use the periodic table to identify elements in simple compounds.

Chemistry (pgs. 25-41)	CA	SCI.8.PCIE.9.f	Apply simple mathematic relationships to determine a missing quantity in a mathematic expression, given the two remaining terms (including speed = distance/time, density = mass/volume, force = pressure x area, volume = area x height).
Physics and Math (pgs. 43-63)	CA	SCI.8.PC.2.b	Students know when an object is subject to two or more forces at once, the result is the cumulative effect of all the forces.
Physics and Math (pgs. 43-63)	CA	SCI.8.PC.2.c	Students know when the forces on an object are balanced, the motion of the object does not change.
Physics and Math (pgs. 43-63)	CA	SCI.8.PC.2.d	Students know how to identify separately the two or more forces that are acting on a single static object, including gravity, elastic forces due to tension or compression in matter, and friction.
Physics and Math (pgs. 43-63)	CA	SCI.8.PC.2.e	Students know that when the forces on an object are unbalanced, the object will change its velocity (that is, it will speed up, slow down, or change direction).
Physics and Math (pgs. 43-63)	CA	SCI.8.PC.2.f	Students know the greater the mass of an object, the more force is needed to achieve the same rate of change in motion.
Rocket Activity (pgs. 69-75)	CA	SCI.8.PC.2.a	Students know a force has both direction and magnitude.
Rocket Activity (pgs. 69-75)	CA	SCI.8.PC.2.b	Students know when an object is subject to two or more forces at once, the result is the cumulative effect of all the forces.
Rocket Activity (pgs. 69-75)	CA	SCI.8.PC.2.d	Students know how to identify separately the two or more forces that are acting on a single static object, including gravity, elastic forces due to tension or compression in matter, and friction.
Rocket Activity (pgs. 69-75)	CA	SCI.8.PC.2.e	Students know that when the forces on an object are unbalanced, the object will change its velocity (that is, it will speed up, slow down, or change direction).
Rocket Activity (pgs. 69-75)	CA	SCI.8.PC.2.f	Students know the greater the mass of an object, the more force is needed to achieve the same rate of change in motion.
Rocket Activity (pgs. 69-75)	CA	SCI.8.PC.3.b	Students know that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements.
Rocket Activity (pgs. 69-75)	CA	SCI.8.PC.3.f	Students know how to use the periodic table to identify elements in simple compounds.
Rocket Activity (pgs. 69-75)	CA	SCI.8.PC.5.b	Students know the idea of atoms explains the conservation of matter: In chemical reactions the number of atoms stays the same no matter how they are arranged, so their total mass stays the same.

Pushing the Envelope			
1998 Science			
Content Standards			
California Science			
Grades 9-12 (Physics)			
Activity/Lesson	State	Standards	
Physics and Math (pgs. 43-63)	CA	SCI.9-12.PH.1.b	Newton's laws predict the motion of most objects. As a basis for understanding this concept Students know that when forces are balanced, no acceleration occurs; thus an object continues to move at a constant speed or stays at rest (Newton's first law)
Physics and Math (pgs. 43-63)	CA	SCI.9-12.PH.1.c	Newton's laws predict the motion of most objects. As a basis for understanding this concept Students know how to apply the law $F = ma$ to solve one-dimensional motion problems that involve constant forces (Newton's second law)
Physics and Math (pgs. 43-63)	CA	SCI.9-12.PH.1.d	Newton's laws predict the motion of most objects. As a basis for understanding this concept Students know that when one object exerts a force on a second object, the second object always exerts a force of equal magnitude and in the opposite direction (Newton's third law)
Physics and Math (pgs. 43-63)	CA	SCI.9-12.PH.1.g	Newton's laws predict the motion of most objects. As a basis for understanding this concept Students know circular motion requires the application of a constant force directed toward the center of the circle
Physics and Math (pgs. 43-63)	CA	SCI.9-12.PH.1.h	Newton's laws predict the motion of most objects. As a basis for understanding this concept Students know Newton's laws are not exact but provide very good approximations unless an object is moving close to the speed of light or is small enough that quantum effects are important
Physics and Math (pgs. 43-63)	CA	SCI.9-12.PH.1.j	Newton's laws predict the motion of most objects. As a basis for understanding this concept Students know how to resolve two-dimensional vectors into their components and calculate the magnitude and direction of a vector from its components
Physics and Math (pgs. 43-63)	CA	SCI.9-12.PH.2.f	The laws of conservation of energy and momentum provide a way to predict and describe the movement of objects. As a basis for understanding this concept Students know an unbalanced force on an object produces a change in its momentum

Physics and Math (pgs. 43-63)	CA	SCI.9-12.PH.4.d	Waves have characteristic properties that do not depend on the type of wave. As a basis for understanding this concept Students know sound is a longitudinal wave whose speed depends on the properties of the medium in which it propagates
Physics and Math (pgs. 43-63)	CA	SCI.9-12.PH.5.n	Electric and magnetic phenomena are related and have many practical applications. As a basis for understanding this concept Students know the magnitude of the force on a moving particle (with charge q) in a magnetic field is $qvB \sin(a)$, where a is the angle between v and B (v and B are the magnitudes of vectors v and B , respectively), and students use the right-hand rule to find the direction of this force
Rocket Activity (pgs. 69-75)	CA	SCI.9-12.PH.1.c	Newton's laws predict the motion of most objects. As a basis for understanding this concept Students know how to apply the law $F = ma$ to solve one-dimensional motion problems that involve constant forces (Newton's second law)
Rocket Activity (pgs. 69-75)	CA	SCI.9-12.PH.1.d	Newton's laws predict the motion of most objects. As a basis for understanding this concept Students know that when one object exerts a force on a second object, the second object always exerts a force of equal magnitude and in the opposite direction (Newton's third law)
Rocket Activity (pgs. 69-75)	CA	SCI.9-12.PH.1.h	Newton's laws predict the motion of most objects. As a basis for understanding this concept Students know Newton's laws are not exact but provide very good approximations unless an object is moving close to the speed of light or is small enough that quantum effects are important
Rocket Activity (pgs. 69-75)	CA	SCI.9-12.PH.1.j	Newton's laws predict the motion of most objects. As a basis for understanding this concept Students know how to resolve two-dimensional vectors into their components and calculate the magnitude and direction of a vector from its components
Rocket Activity (pgs. 69-75)	CA	SCI.9-12.PH.2.f	The laws of conservation of energy and momentum provide a way to predict and describe the movement of objects. As a basis for understanding this concept Students know an unbalanced force on an object produces a change in its momentum